

2-1

Skills Practice

Inductive Reasoning and Conjecture

Make a conjecture about the next item in each sequence.



2. $-4, -1, 2, 5, 8$

3. $6, \frac{11}{2}, 5, \frac{9}{2}, 4$

4. $-2, 4, -8, 16, -32$

Make a conjecture based on the given information. Draw a figure to illustrate your conjecture.

5. Points A, B , and C are collinear,
and D is between B and C .

6. Point P is the midpoint of \overline{NQ} .

~~7. $\angle 1, \angle 2, \angle 3$, and $\angle 4$ form four
linear pairs.~~

~~8. $\angle 3 = \angle 4$~~

Determine whether each conjecture is *true* or *false*. Give a counterexample for any false conjecture.

9. Given: $\angle ABC$ and $\angle CBD$ form a linear pair.

Conjecture: $\angle ABC \cong \angle CBD$

10. Given: $\overline{AB}, \overline{BC}$, and \overline{AC} are congruent.

Conjecture: A, B , and C are collinear.

11. Given: $AB + BC = AC$

Conjecture: $AB = BC$

12. Given: $\angle 1$ is complementary to $\angle 2$, and $\angle 1$ is complementary to $\angle 3$.

Conjecture: $\angle 2 \cong \angle 3$

2-2 Skills Practice

Logic

~~Use the following statements to write a compound statement for each conjunction and disjunction. Then find its truth value.~~

$$p: -3 - 2 = -5$$

q : Vertical angles are congruent.

$$r: 2 + 8 > 10$$

s : The sum of the measures of complementary angles is 90° .

1. p and q

2. $p \wedge r$

3. p or s

4. $r \vee s$

5. $p \wedge \sim q$

6. $q \vee \sim r$

Copy and complete each truth table.

7.

p	q	$\sim p$	$\sim p \wedge q$	$\sim(\sim p \wedge q)$
T	T			
T	F			
F	T			
F	F			

8.

p	q	$\sim q$	$p \vee \sim q$
T	T	F	
T	F	T	
F	T	F	
F	F	T	

Construct a truth table for each compound statement.

9. $\sim q \wedge r$

q	r	$\sim q$	$\sim q \wedge r$

10. $\sim p \vee \sim r$

p	r	$\sim p$	$\sim r$	$\sim p \vee \sim r$

2-2 Practice

Logic

Use the following statements to write a compound statement for each conjunction and disjunction. Then find its truth value.

p : 60 seconds = 1 minute

q : Congruent supplementary angles each have a measure of 90.

r : $-12 + 11 < -1$

1. $p \wedge q$

2. $q \vee r$

3. $\sim p \vee q$

4. $\sim p \wedge \sim r$

Copy and complete each truth table.

5.

p	q	$\sim p$	$\sim q$	$\sim p \vee \sim q$
T	T			
T	F			
F	T			
F	F			

6.

p	q	$\sim p$	$\sim p \vee q$	$p \wedge (\sim p \vee q)$
T	T			
T	F			
F	T			
F	F			

Construct a truth table for each compound statement.

7. $q \vee (p \wedge \sim q)$

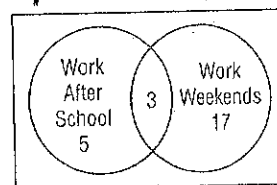
p	q	$\sim q$	$p \wedge \sim q$	$q \vee (p \wedge \sim q)$

8. $\sim q \wedge (\sim p \vee q)$

p	q	$\sim p$	$\sim q$	$\sim p \vee q$	$\sim q \wedge (\sim p \vee q)$

SCHOOL For Exercises 9 and 10, use the following information.

The Venn diagram shows the number of students in the band who work after school or on the weekends.



9. How many students work after school and on weekends?

10. How many students work after school or on weekends?

2-3 Skills Practice**Conditional Statements**

Identify the hypothesis and conclusion of each statement.

1. If you purchase a computer and do not like it, then you can return it within 30 days.

2. If $x + 8 = 4$, then $x = -4$.

3. If the drama class raises \$2000, then they will go on tour.

Write each statement in if-then form.

4. A polygon with four sides is a quadrilateral.

5. "Those who stand for nothing fall for anything." (Alexander Hamilton)

~~6. An acute angle has a measure less than 90.~~

Exercises

Write the converse, inverse, and contrapositive of each conditional statement. Tell which statements are *true* and which statements are *false*. *If false, provide a counterexample.*

1. If you live in San Diego, then you live in California.

Converse

Inverse

Contrapositive

2-4 Skills Practice

Deductive Reasoning

Determine whether the stated conclusion is valid based on the given information. If not, write *invalid*. Explain your reasoning.

If the sum of the measures of two angles is 180, then the angles are supplementary.

1. Given: $m\angle A + m\angle B$ is 180.

Conclusion: $\angle A$ and $\angle B$ are supplementary.

2. Given: $m\angle ABC$ is 95 and $m\angle DEF$ is 90.

Conclusion: $\angle ABC$ and $\angle DEF$ are supplementary.

3. Given: $\angle 1$ and $\angle 2$ are a linear pair.

Conclusion: $\angle 1$ and $\angle 2$ are supplementary.

Use the Law of Syllogism to determine whether a valid conclusion can be reached from each set of statements. If a valid conclusion is possible, write it.

4. If two angles are complementary, then the sum of their measures is 90.
If the sum of the measures of two angles is 90, then both of the angles are acute.

5. If the heat wave continues, then air conditioning will be used more frequently.
If air conditioning is used more frequently, then energy costs will be higher.

Determine whether statement (3) follows from statements (1) and (2) by the Law of Detachment or the Law of Syllogism. If it does, state which law was used. If it does not, write *invalid*.

6. (1) If it is Tuesday, then Marla tutors chemistry.
(2) If Marla tutors chemistry, then she arrives home at 4 P.M.
(3) If Marla arrives at home at 4 P.M., then it is Tuesday.

7. (1) If a marine animal is a starfish, then it lives in the intertidal zone of the ocean.
(2) The intertidal zone is the least stable of the ocean zones.
(3) If a marine animal is a starfish, then it lives in the least stable of the ocean zones.